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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/352,976	07/14/1999	MICHAEL D. GILBERT	50126-002001	2851

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EXAMINER

CHANG, VICTOR S

ART UNIT	PAPER NUMBER
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1771

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DATE MAILED: 04/01/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/352.976

Applicant(s)

GILBERT, MICHAEL D.

Examiner

Victor S Chang

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32 and 34-43 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-32 and 34-43 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2,3.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other

DETAILED ACTION

Election/Restrictions

1. Applicant's election of Group 1, claims 1-32 and 34-43 in Paper No. 8 is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).

Claim Rejections - 35 USC § 112

2. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

3. Claims 1-29 and 34-43 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. Good adhesion at the interface is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

Specifically, in the independent claim 1, line 7, "whereby said adhesive bond is weakened at said interface". It appears to the Examiner that the Applicant is claiming a composition with poor adhesion to the substrate, and it is not clear how the adhesion became poor and why the Applicant wants to use a composition with poor adhesion to the substrate, while the applications of the instant claimed invention is directed toward an adhesive and coating material.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 1-32 and 34-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moulton et al. (US 5441830) either individually, or alternatively in view of Nippon Telegraph and Telephone Corporation (JP 405094818A).

Moulton's invention is directed to modify the surface of conductive plastic foil current collectors to be more adherent to an electrode paste by placing a layer of an electrically-conducting adhesion-promoter onto the surface of the current collector which is to be interposed between the foil and the electrode paste (column 2, lines 19-24).

Moulton teaches that composite cathodes and composite anodes are well known in the art. Typically, the "composite electrode" contains a polymer which acts to bind the composite materials together and an electrolytic solvent. For example, a composite cathode can comprise a compatible cathodic material, a conductive material, an electrolytic solvent, an alkali salt, and a solid matrix forming polymer. (column 8, lines 10-21). In terms of weight ratios, a cathodic paste can be prepared by combining from about 1 to about 20 weight percent of a conductive material, from about 35 to about 60 weight percent of a compatible cathodic material, from about 10 to about 50 weight percent of an electrolytic solvent and from about 5 to 30 weight percent of a cathode

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prepolymer all based on the total weight of the cathode paste (column 12, lines 12-20). Suitable cathode prepolymers are well known in the art and preferably are alkali or alkaline earth metal ion conducting. Suitable cathode prepolymers include, by way of example, propylene oxide, ethyleneimine, ethylene oxide, epichlorohydrin, acryloyl-derivatized polyalkylene oxides, urethane acrylates, vinyl sulfonate polyalkylene oxides, and the like as well as mixtures thereof (column 12, lines 26-35). The cathode paste can optionally contain film forming agents which are well known in the art and include, by way of example, polyethylene oxide, polypropylene oxide, copolymers thereof, and the like, having a numbered average molecular weight of at least about 100,000. Preferably, the film forming agent is employed in an amount of about 1 to about 10 weight percent and more preferably at about 2.5 weight percent based on the total weight of the cathode composition (column 12, lines 36-44). The electrolytic solvent employed in the cathode paste is not critical but preferably is a 10:1 to 1:10 mixture of ethylene and/or propylene carbonate to triglyme (column 12, lines 63-66). Curing or crosslinking is generally accomplished by conventional techniques to form a solid electrode. For example, suitable curing methods include heating, irradiation with electron beams (EB), etc. When the composition is cured by heating, the composition preferably contains an initiator. For example, heat curing initiators are typically peroxides such as benzoyl peroxide, methyl ethyl ketone peroxide, t-butyl peroxypropionate, diisopropyl peroxydicarbonate, and the like (column 13, lines 29-38).

Additionally, it is well known that problems arise when an electrode layer is formed on a current collector typically in the form of a metal foil. Numerous repetitions of

charge-discharge cycles exacerbates the interfacial adhesion between the current collector and the electrode layer and lowers the discharge capacity of the electrodes, resulting in an insufficient cycle life. Fine particles of the electrode layer shed from the current collector can cause short-circuits (US 5565284, column 39-46). In other words, it is common knowledge to one having ordinary skill in the art that, with the electrical current passing through, the interfacial adhesion between the electrode and the current collector (i.e., metal foil surface) degrades

Moulton teaches that the electrically-conducting adhesion-promoter is a solid polymeric layer which comprises an effective amount of a conductive material so as to render the polymeric layer conductive, a polymer and acid functionalities. It is believed that the acid functionalities of the solid polymer composition are provided in situ for adhesive/binding functionalities which, when contacting the conductive plastic foil, enhance the adherence of the foil to the adhesion-promoter layer (column 2, lines 36-45). The electrically-conducting adhesion-promoter comprises from about 30 to 80 weight percent of a conductive material, from about 20 to about 70 weight percent of a prepolymer or polymer thereof, and an effective amount of acid functionalities so as to enhance the adherence of this layer of electrically-conducting adhesion-promoter to the surface of the conductive plastic foil (column 2, lines 56-65). Examples of suitable solid matrix forming monomers include, by way of example, acrylic acid ($\text{CH}_2=\text{CHCOOH}$), chloroacrylic acid ($\text{ClCH}=\text{CHCOOH}$), bromoacrylic acid ($\text{BrCH}=\text{CHCOOH}$), ethyleneimine, urethane acrylate, vinyl sulfonate polyalkylene oxides, and the like as well as mixtures thereof (column 5, lines 39-64). The acid functionalities can be

incorporated directly into the solid polymeric matrix either as a homopolymer (e.g., polyacrylic acid) or as a copolymer, terpolymer, etc. wherein at least one of the components of the copolymer, terpolymer, etc. is a solid matrix forming monomer containing acid functionality (e.g., acrylic acid, vinyl sulfonic acid, etc.). Depending upon the particular monomers, the copolymers, terpolymers, etc. employed can be random copolymers, terpolymers, etc. or can be blocked copolymers, blocked terpolymers, etc (column 6, lines 15-24). The composition is cured by conventional techniques to form a solid layer of electrically-conducting adhesion-promoter on the surface of the current collector (column 8, lines 61-64).

Although the "phase separated" regions of polymer matrix and electrolyte are not expressly taught by Moulton, the Examiner takes Official notice that these are well known to one of ordinary skill. Alternatively, Nippon '935 teaches a battery positive electrode sheet which can be applied to a battery having a high energy density. In a high polymer solid electrolyte mainly of a phase-separated high polymer matrix and a metallic salt electrolyte, the minute particles of a battery positive electrode active material and an electron conductor are dispersed to form a battery positive electrode sheet. Therefore, it would be obvious to one having ordinary skill in the art to prepare a composite polymeric electrode material of Moulton with suitable phase separated regions of polymer matrix and electrolyte, as taught by Nippon '935, motivated by the desire to achieve enhanced conductivity in the electrolyte phase, or region.

Furthermore, the Examiner takes Official notice that the use of zeolites, clays and polymer gels as a means to provide controlled release of crosslinking agent for a

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curable polymer matrix, and adding various conventional coating additives such as pigments, corrosion inhibitors, leveling agents, gloss promoters, etc., to a coating composition is common knowledge to one of ordinary skill.

As such, in the absence of unexpected results, it would be obvious to one having ordinary skill in the art to modify the conventional phase separated electrode material with suitable adhesive or coating additives, motivated by the desire of improved adhesive and coating properties so as to use the composition as an adhesive or coating material, with the expectation to successfully disbond the adhesive (or coating) from conductive substrate with an electrical current applied to the conductive adhesive (or coating) and the substrate.

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. In addition, the following references are cited of interested for polymeric electrode and electrolyte:

US 5609795 to Matsumoto et al.

US 5824120 to Mitchell et al.

US 5520850 to Chaloner-Gill et al.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S Chang whose telephone number is 703-605-4296. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H Morris can be reached on 703-308-2414. The fax phone numbers

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for the organization where this application or proceeding is assigned are 703-872-9310 for regular communications and 703-872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0661.

VSC

VSC

March 19, 2002



TERREL MORRIS
SUPERVISORY PATENT EXAMINER
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